C. A. COSTIGAN & J. DENARO.

BAKING MACHINE.

APPLICATION FILED MAR. 27, 1914.

1,209,939.

Patented Dec. 26, 1916.

3 SHEETS—SHEET 1.

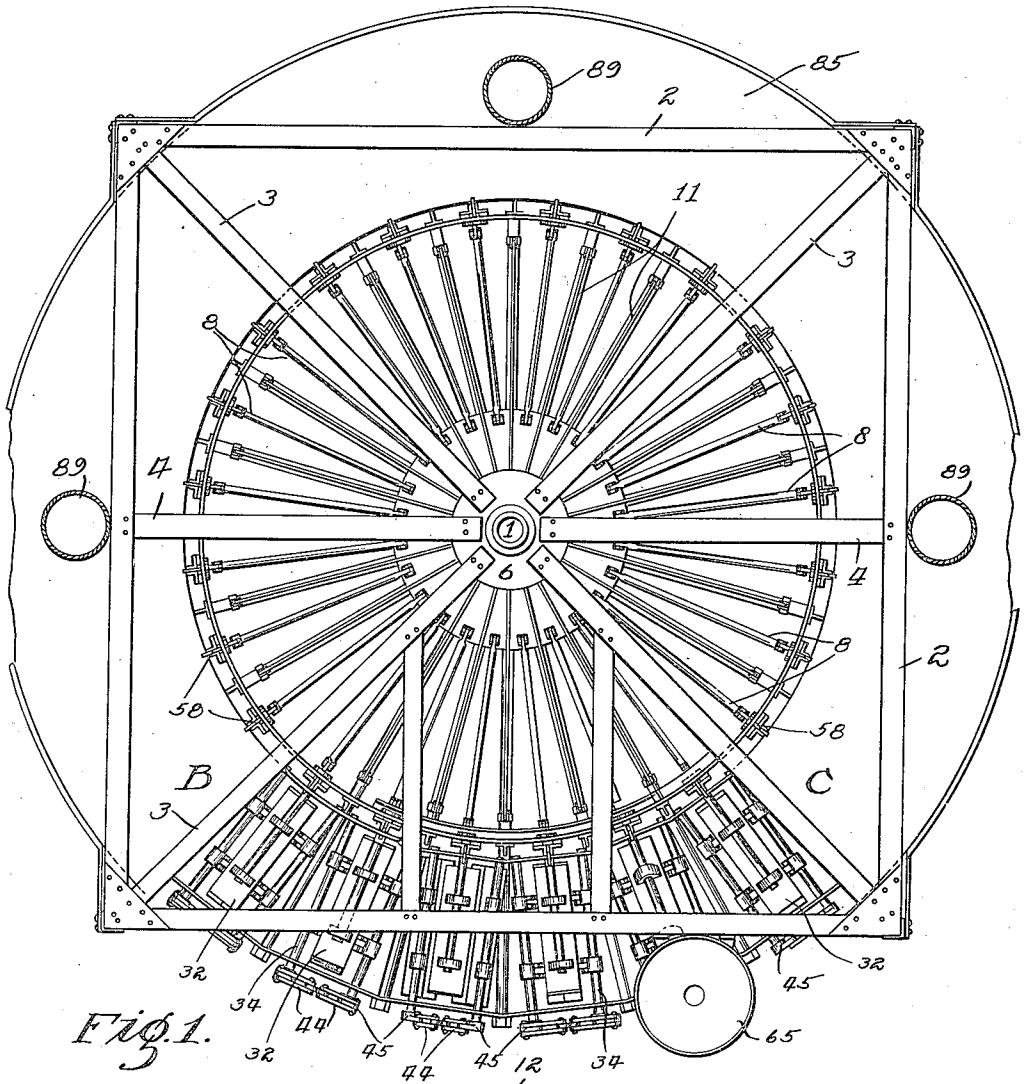


Fig. 1.

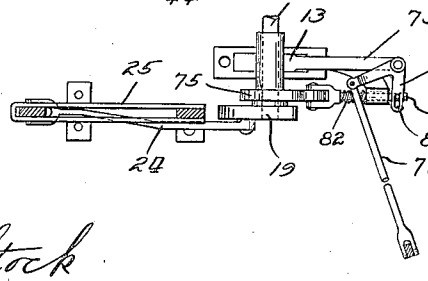


Fig. 3.

WITNESSES:

A. G. Stock

R. M. Ogarzo

INVENTORS

Charles A. Costigan

James Denaro.

BY

Harry C. Schroeder

ATTORNEY

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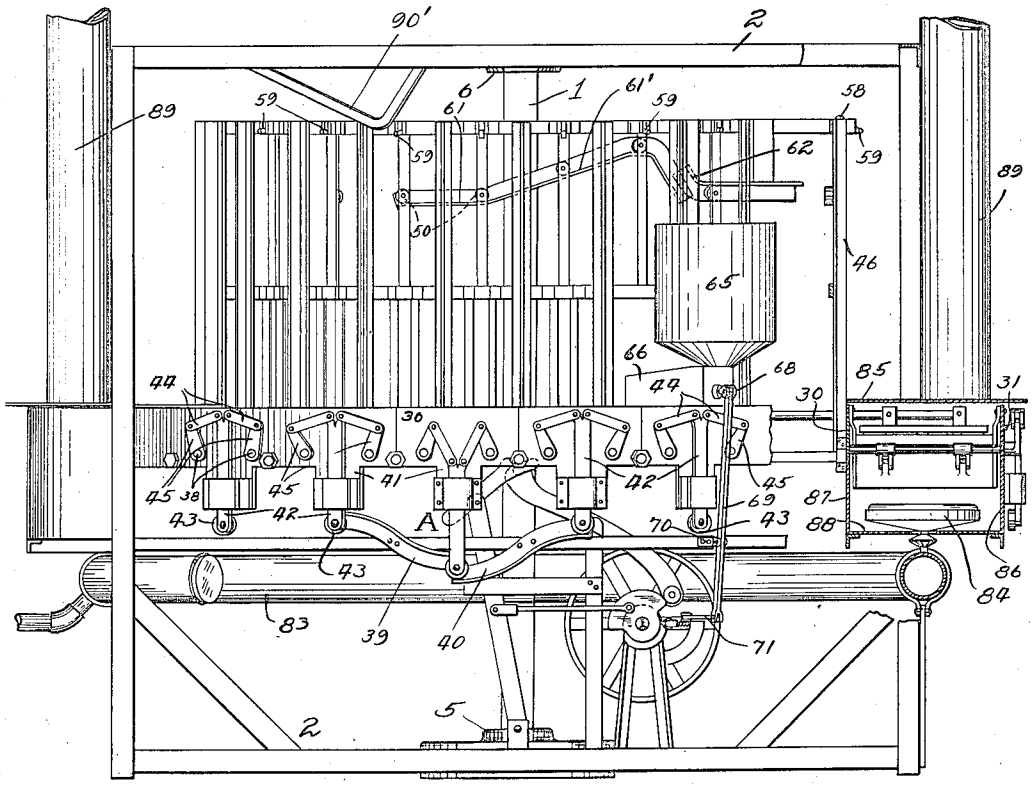


Fig. 2.

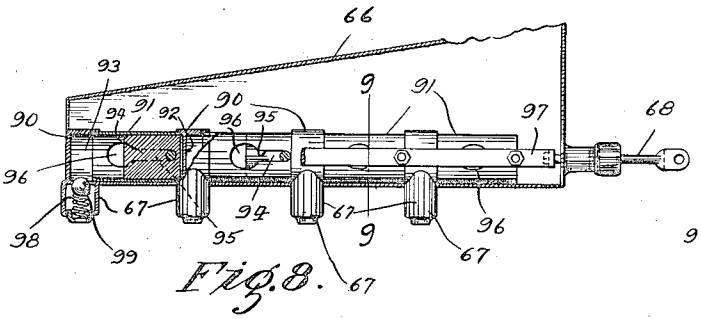


Fig. 8.

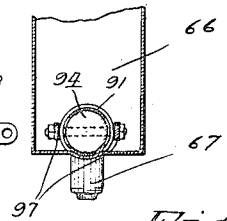


Fig. 9.

WITNESSES:

H. A. Stock

R. M. Ogargo

INVENTORS

Charles A. Costigan

James Denaro

BY

Harry C. Schroeder

ATTORNEY

C. A. COSTIGAN & J. DENARO.

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3 SHEETS—SHEET 3.

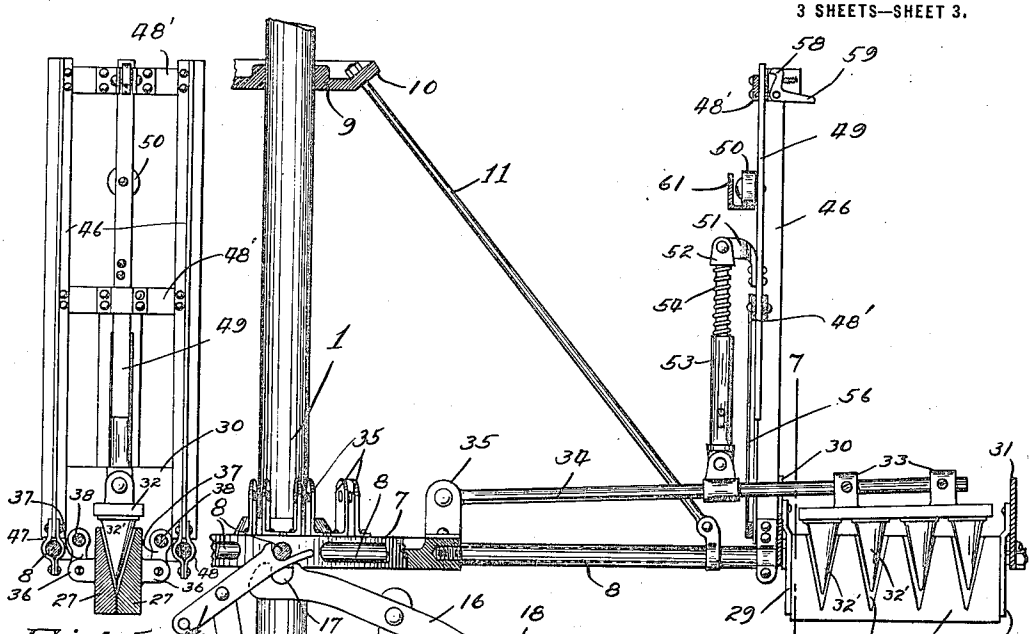


Fig. 5.

Fig. 4.

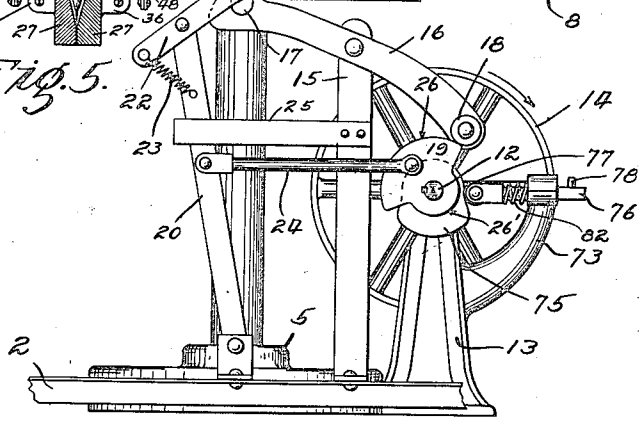


Fig. 7.

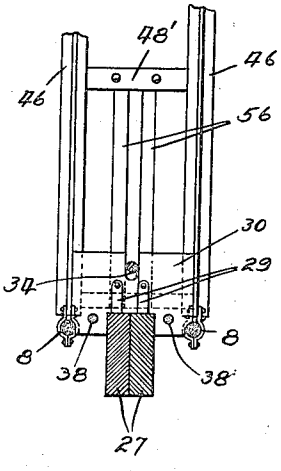
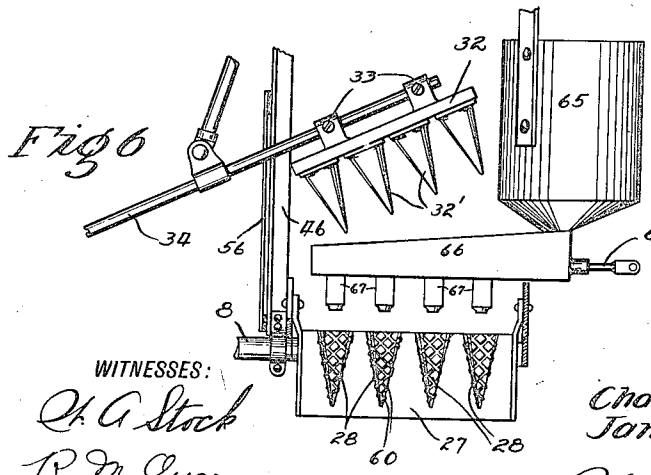


Fig 6



WITNESSES:

C. A. Stock

R. M. Ogara

INVENTORS

Charles A. Costigan

James Denaro

BY

Harry C. Schroeder

ATTORNEY

UNITED STATES PATENT OFFICE.

CHARLES A. COSTIGAN AND JAMES DENARO, OF OAKLAND, CALIFORNIA.

BAKING-MACHINE.

1,209,939. Specification of Letters Patent. Patented Dec. 26, 1916.

Application filed March 27, 1914. Serial No. 827,691.

To all whom it may concern:

Be it known that we, CHARLES A. COSTIGAN and JAMES DENARO, citizens of the United States, residing at Oakland, in the county of Alameda and State of California, have invented certain new and useful Improvements in Baking-Machines, of which the following is a specification.

This invention relates to ovens, which are gas heated and in which the various operations take place continuously, the molds being automatically filled, passed through the oven and emptied of their contents.

The principal object of our invention is to provide an oven for continuously baking ice cream cones and in which all operations are mechanically performed in order to produce superior cones in large quantities. With an oven of this character the cones may be produced much more cheaply than with the usual hand operated devices, also with the improved mold a neater cone is produced, at the same time all handling is eliminated, thereby making a more sanitary and cleanly product.

With these and other objects in view our invention consists in the new and novel arrangement and combination of parts as herein described and as more specifically pointed out in the appended claims.

Referring to the accompanying drawings, which form a part of the specification, Figure 1 is a view in plan of our improved oven. Fig. 2 is a view in front elevation partly broken away to disclose the inclosing walls of the oven portion and location of the gas burner. Fig. 3 is a detailed view in plan of the mechanism for operating the batter feed. Fig. 4 is a view in elevation showing the mechanism for lifting the upper portion of the molds and for rotating the spider, which carries the same. Fig. 5 is a detailed view in section with the molds in their closed position and the operating mechanism for lifting the top part thereof. Fig. 6 is a detailed view in side elevation showing the top of a mold in its uppermost position and the batter feed container. Fig. 7 is a view in section on the line 7—7 Fig. 4. Fig. 8 is a detailed sectional view of the batter feed spout. Fig. 9 is a view in section on 9—9 Fig. 8.

Denoting corresponding parts by the same numerals of reference, 1 denotes an upright shaft central with a suitable frame 2 to which it is held by diagonals 3 and braces 4. This shaft is pivotally mounted at its lower end in the step bearing 5 and at its upper end in the journal 6 and keyed near its center is a spider 7 to which are attached a number of radial arms 8. Below the journal 6 there is keyed to the shaft a collar 9 having an angular flange 10 in which are held brace rods 11 which connect to the outer ends of arms 8. The rotating frame thus constructed has imparted to it an intermittent rotary motion by means of the mechanism shown in Figs. 3 and 4, consisting of a shaft 12 pivotally mounted in suitable bearings 13 and driven by a pulley 14 from any suitable source of power. Adjacent this shaft is a rigid upright member 15 having pivoted to its upper end the lever 16, one end of which is provided with a notch 17 adapted to engage the arms 8 for the purpose of holding them in a non-rotative position. On the other end of the lever 16 is mounted a roller 18 adapted to engage the cam 19 keyed on shaft 12. Adjacent this bar 15 is a lever 20 moving in a slotted guide 25, pivoted to the frame at its lower end and carrying on its upper end a pawl 22, which is adapted to engage the arms 8. A spring 23 holds the pawl in engagement therewith and the lever has imparted to it an oscillating motion by means of a connecting rod 24 pivoted intermediate the length thereof and to the face of cam 19. It will be evident that when the driving pulley 14 is rotated in the direction of the arrow that a rocking motion will be imparted to lever 20 by the connecting rod 24 and this movement will cause the pawl 22 to drive the spider and associated arms to the right. During this forward movement the slot 17 is held below the arms 8 by virtue of the fact that roller 18 is held up by the circular portion 26 of cam 19, and when the connecting rod 24 has reached its extreme movement toward the right the cam will have rotated sufficient distance to allow the roller 18 to drop on the portion 26′, thus throwing slot 17 into engagement with one of the arms 8. Further rotation brings lever 20 back to the left in position to engage the next succeeding arm. The construction of these parts is such that each revolution the shaft 12 advances the spider and associated parts an angular distance equal to the distance between the arms thereof and

each time the arms stop the same relative angular position above the slotted end of lever 16.

Between each pair of arms 8 is placed the divided molds in which the cones are baked and the mechanism for operating each set of molds is the same, consequently, the description for one will serve for all. Each mold consists of two side plates 27 having formed therein the conical recesses 28. On each end of these molds are attached arms 29 extending above the upper surface and being pivotally mounted in plates 30 and 31 held on the arms 8. An upper mold plate 32 is provided having the conical projecting members 32′, which when the mold is closed projects into the recesses 28, but being somewhat smaller give a thin annular space therebetween, in which the batter is held and baked. Lugs 33 are provided on the upper surface of this plate through which extends a rod 34, this rod being pivotally mounted at its inner end in brackets 35 attached to the spider 7. The plates 27 are formed with lugs 36 on the sides thereof and the latter are pivotally connected to arms 37, which are mounted on rods 38. These rods are pivoted in plates 30 and 31 and are oscillated by means of curved bars 39 and 40 mounted in front of the machine. Plates 31 are provided with the depending portion 41 upon which is attached a guide for the vertically sliding bar 42. This bar carries on its lower end a roller 43, which engages the underside of the curved bar 39 and the upper side of the curved bar 40. The upper end of this bar 42 is bifurcated and has attached thereto the links 44, which in turn are pivoted to arms 45 keyed to rods 38 on the outside of plate 30. Thus when the roller engages the surface 39 bar 42 is pulled downward as shown at "A" of Fig. 2 and opens out the mold plates allowing the contents thereof to drop into a suitable receptacle. As the roller contacts with the surface 40 the parts are again forced upward until the pivotal points between the links and bar 42 are above the pivotal points of the links and arms 45, thus forming a lock to prevent the molds opening by pressure within the baking operation.

Back of plate 30 are two vertical T bar members 46 clamped to the arms as shown at 47 and 48. The guides are provided on bars 48′ connecting these members in which is slidably mounted the member 49 and pivoted to the latter is a roller 50. Below this roller is attached a bracket 51 having pivoted thereto a link 52 slidable in a sleeve 53 and having a spring 54 interposed therebetween. The lower end of sleeve 53 is pivotally attached to the rod 34 in which the mold plate is held. Guide bars 56 are provided on each side of this rod 34 so as to prevent lateral movement thereof.

On the upper connecting strip 48′ there is mounted a spring controlled latch 58 having the projecting end 59 and a hook which engages the upper end of the sliding member 49. During the baking operation plate 32 is held tightly in contact with the upper surface of the mold plates 27 and the upper end of 49 is under the latch 58, the spring 54 being in compression to exert the downward force which holds the mold plate upon the molds. Certain cam surfaces 61 and 62 are provided to contact with roller 50 to raise the bar 49 and with it the mold plate 31, during the discharging and filling operation, and to depress bar 49 after the filling of the molds until the upper end becomes engaged by the hook of the latch 58.

A tank is denoted by 65 in which is contained the batter and from this tank is provided a lateral extending foot 66 provided therein with plungers adapted to discharge a measured quantity of batter through the tubes 67 which are positioned centrally above the conical cavities of one of the molds during an interval of rest. A horizontally reciprocating plunger 68 extends through this foot and is connected on the outside by a link 69 pivotally mounted as at 70 and to the lower end of this link is attached a connecting rod 71 having its other end pivotally attached to a bell crank lever 72. The latter is supported upon a bracket arm 73 extending from the shaft supports 13. Back of cam 19 there is mounted a second cam 75 which is adapted to impart an outward reciprocating motion to the rod 76, during the interval when the spider and molds are at rest. This bar is provided with a roller 77 where it contacts with the cam and is slidably mounted in a guide on the side of the bracket arm 73. Bar 76 is square or rectangular in section to prevent rotation thereof and is provided on the upper surface with a pin 78 which contacts with a slot 81 and the other arm of bell crank 72.

Within the foot 66 is a cylindrical tube formed of the T members 90 connected by short section of tubing 91. The members 90 are provided with an interior division wall 92 so that there is formed a plurality of cylinders 93 in each of which is a piston 94. The tubular members 91 are provided on each side with an elongated slot 95 which is enlarged at one end or at 96. Plunger 68 has attached within the foot a U shaped bar 97 having its arms parallel and fitting closely along the outside of the cylinders. Holes are provided in these arms in which bolts are provided which extend through the slotted openings 95 and through the pistons 94. By this means when the plunger is moved the pistons are all moved in unison therewith.

The outlet 67 of the T members is provided with a ball valve 99 sealed by a spring

98, which prevents air from being sucked into the cylinders on the backward movement of the piston.

It will be evident that when the rod 76 is moved to the right by the rotation of cam 75, such motion through the bell crank 72, rod 71, and lever 69 will push the plunger 68 into the foot 66, thereby pushing the pistons 94 forward. As the latter moves forward the openings 96 are closed thereby trapping a certain quantity of batter in the forward end of the cylinder which is discharged through valve 99, as the piston continues to move forward. Spring 82 causes the roller to follow the cam and restore the parts to the normal position. From the point B to the point C in the counter-clockwise direction the operation of discharging, filling and closing the molds takes place, while from the point C to point B baking takes place and under this portion we provide a curved gas pipe 83 upon which is mounted a plurality of burners 84.

To conserve the heat we provide close above the top of the molds, a stationary plate 85 which extends over and is also in contact with the upper edge of plates 30 and 31, thus forming a close cavity above the molds. Likewise below the molds we provide stationary vertical walls 86 and 87, which aline with the plates 30 and 31 respectively, and which are connected below the burners by plate 88. These plates extend from C to B providing throughout this distance the substantially air tight cavity in which the molds move, suitable gas outlets 89 being provided to carry off the products of combustion.

The operation of this device is as follows:—As the molds emerge from the closed chamber at the point B the extending end 59 of the latch 58 contacts momentarily with the bar 90′ which pulls the hook from the top of bar 49 allowing the spring 54 to project the latter upward a sufficient distance to prevent relocking thereof. After this bar has become unlatched the roller 50 engages the cam surface 61 and is slightly raised thereby pulling up rod 34 and the mold plate 32 attached thereto. This slight upward movement serves to separate the conical projections from the cones which are held in the molds and as additional security against the cones separating from the molds we provide a series of corrugations 60 in the surface thereof which also serve to produce an ornamental design on the exterior of the baked cone. The next operation after this is the opening of the mold plates, which as heretofore explained, is accomplished by the roller 43 contacting with the cam surface 39. During this opening of the molds, conical members 32 prevent the cones from following either half of the molds thus insuring their complete removal therefrom. The operation from the unlatching to the discharging takes place during one forward movement of the device. During the next forward movement the molds are closed and locked during which time the plate 32 is being raised by reason of the roller 50 contacting with the inclined portion 61′ which upward movement is continued during the succeeding movement. At the end of this period the roller 50 has reached its higher point and the plate 32 its position as shown in Fig. 6, the molds being directly under the spouts 67 of the feed mechanism. While the mechanism is thus stationary cam 75 operates the mechanism associated with the batter feed and injects a measured quantity into each mold. During the next advance, plate 32 is lowered and roller 50 engages the surface 62, which acts to depress bar 49 under latch 58 thus holding all parts tightly together as the molds enter the oven chamber at C. The baking continues from this point to point C and it will of course be understood that these several operations take place simultaneously and that approximately ¾ of the molds are always in the oven, the baking process being completed.

While we have shown the preferred embodiment of our invention it will of course be understood that minor changes may be made in detail and form of construction without departing from the spirit thereof or sacrificing any of the advantages.

What we claim as new and wish to cover by Letters Patent is:—

1. In a device of the character described, comprising a segmental gas heated oven, open at the ends, a plurality of molds revolubly mounted and adapted to pass through said oven, means for imparting an intermittent forward movement to the revoluble structure carrying said molds, each of said molds consisting of two side plates and a cover plate, said side plates being pivotally mounted and provided with alining recesses in which the baking takes place, a toggle joint connecting said side plates adapted to swing said side plates apart, close said plates and to hold the same against internal pressure during the baking operation, a cam adapted to operate said toggle-joint, means for placing a measured quantity of batter in said molds during the period when the said revoluble structure is at rest, and means for clamping said lid on said side plates before said molds enter said oven.

2. In a device of the character described, comprising a plurality of molds mounted upon a revoluble structure, an oven through which said molds are carried by the rotation of said structure, each of said molds having two pivotally mounted side plates, having alining recesses formed partly in each plate and open at the top, a toggle joint connecting said side plates, a cam adapted to oper-

ate said toggle joint, the latter being so disposed that the common pivoted ends of the links move past the center of the outer ends thereof forming a lock to prevent the internal pressure forcing the mold halves apart, a cover plate adapted to close said recesses, depending projections from said cover adapted to enter within said recesses and form a thin annular space therebetween.

3. A baking oven of the character described comprising a rotatable support provided with radiating members, molds carried by said radiating members, an oven through which said molds are caused to travel, a rotatable shaft provided with a cam, a lever pivoted contiguous to said cam, means connected with said shaft for oscillating said lever, a pawl carried by said lever for engaging the radiating members to impart step-by-step movement to said support, and a latch operated by said cam to successively engage said radiating members.

4. In a device of the character described comprising a revoluble structure, a plurality of molds carried by said structure, a segmental oven through which said molds are adapted to move, means for imparting an intermittent rotative movement to said structure and means for locking said structure during its periods of rest, said molds being formed of two pivotally mounted side plates, alining recesses between said plates, means for opening and closing said plates, a cover plate for said molds adapted to enter said recesses and form an annular recess therebetween and the walls of said recess, said cover plate being mounted upon a rod pivotally mounted adjacent the center of said rotative structure, a bar slidably mounted above said rod, a sleeve pivotally attached to said rod, a rod pivotally attached to said bar, said rod having a limited sliding movement in said sleeve, a compression spring interposed between said sleeve and said rod, a spring controlled latch adjacent the upper end of said bar, a roller on the back of said bar, a fixed cam bar mounted upon the supporting frame of said device adjacent the exit of said oven, said cam bar being adapted to withdraw said latch from the top of said bar, a stationary cam bar adapted to engage said roller after said bar has been released and raise said cover plate and a second cam bar adjacent the entrance of said oven adapted to engage the upper side of said roller and depress said bar against the action of said spring and allow the said latch to engage the upper end of said bar, thus holding the cover plate closed during the travel through said oven.

5. In a device of the character described comprising, a revoluble structure, a segmental oven, a plurality of molds carried by said structure, in alinement with said oven, said molds each comprising two pivotally mounted side plates and a cover plate, a rod pivotally mounted adjacent the center of said structure and carrying said cover plate on its outer end, a cam operated lock bar slidably mounted above said rod, a resilient connection between said rod and said bar, a cam adapted to depress said bars before the molds enter said oven, a latch adapted to hold said bar depressed and means for releasing said latch when the molds leave said oven.

6. In a device of the character described, comprising a revoluble structure, a segmental oven, a plurality of molds carried by said structure and arranged to pass through said oven, a cover plate for said molds carried by a rod pivoted to said structure, a lock bar attached to said rod, cam surfaces adapted to actuate said lock bar for the purpose of raising and closing said cover plate, a latch for locking said bar before the molds enter said oven and means for releasing said latch on the exit of said molds.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES A. COSTIGAN.
JAMES DENARO.

Witnesses:
W. A. STOCK,
R. M. OYARZO.